M6-520 / 540 / 560

CHARACTERISTICS

Processor Overdrive II Performance Upgrade Socket	**M6-520** i486SX @ 25 MHz soldered OverDrive II socket available
	M6-540 i486DX @ 33 MHz installed in the OverDrive II socket (*)
	M6-560 i486DX2 @ 33/66 MHz installed in the OverDrive II socket (*)
Optional processor	- i487 SX @ 25 MHz (for M6-520 only) - i486 DX2 @ 25/50 MHz or 33/66 MHz - P24T OverDrive Coprocessor
Clock	25 MHz or 33 MHz
Architecture	MICROCHANNEL
Memory	On-board from 8 MB to 64 MB **Bank 0**: Two 4 MB SIMMs (8 MB) installed at the factory **Bank 1**: Two sockets for these SIMMs: **EXM 28-004** - 4 MB One 1MB x 36 SIMM **EXM 28-008** - 8 MB One 2 MB x 36 SIMM **EXM 28-016** - 16 MB One 4 MB x 36 SIMM - SIMMs must be installed in pairs. - SIMMs of the same pair must have the same capacity. - Different SIMM pairs can be used. - To reach 64 MB, the SIMMs in bank 0 must be replaced.
Memory access	70 ns
Video memory	1 MB - Four 256 K x 8 - 80 ns VRAM chips
Floppy Disks	3.5"2.88 MB Sony MP-F40W-17 3.5"2.88 MB Sony MP-F40W-17/1
Hard Disks	Quantum ELS127S 120 MB SCSI CONNER CP30200 210 MB SCSI SEAGATE ST3283N 210 MB SCSI SEAGATE ST1581N 525 MB SCSI CONNER CP30540 525 MB SCSI DIGITAL DSP3105 1050 MB SCSI SEAGATE ST31200N 1050 MB SCSI
Streaming Tapes	**Irwin 31250A** 80/120 MB Floppy interface **Irwin 287** 80/120 MB Floppy interface **Wangtek 5150ES-ACA** 150 MB SCSI interface. Requires the ASC-2 controller.
Slots	Three MCA slots on the expansion bus
Video controller	Integrated, ATI 68800 Super VGA
Integrated HDU and FDU controllers	Floppy disk controller: 82077SL-1 SCSI HDU controller: NCR53C700-66
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

(*) To install an optional processor, the original one already installed must first be removed.

3

MOTHERBOARD

On-board memory can be ordered directly from the factory.
BASE ASSEMBLY BA2029
BA 2015   M6-520
BA 2027   M6-540
BA 2028   M6-560
BASE ASSEMBLY BA2095
BA 2096   M6-520
BA 2097   M6-540
               M6-560

BIOS

The ROM BIOS is a Flash EPROM. The BIOS code is provided on diskettes and must be copied into Flash EPROM.

Last level: Rev. R1.47.36

EXPANSION BUS

IN 2004

POWER SUPPLY

PS11 A 220 V - 115 V

PS11 AR 220 V - 115 V

MOTHERBOARD

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2029	Nasc.		The ROM BIOS is a Flash EPROM. The BIOS code is provided on diskettes and must be copied into the Flash EPROM. The following BIOS versions are used: - X0. 37. 30 - R1.47.32 - R1.47.36 See the specific table.	Base Assembly - Code BA2029 identifies the printed circuit board on which the different processors are installed. Depending on the processor installed, the printed circuit board will be identified with the BA name indicated further on.
	Lev. 01			--
	Lev. 02			--
	Lev. 03			--
	Lev. 04 MI			New printed circuit incorporating the updated wirings.
	Lev. 04S1			Component BT 481 KPJ-85 is no longer produced and is replaced by BT 481AKPJ-110. Since these boards are no longer manufactured, this modification has effect at field level only.
	Lev. 04 S2			- The 25 MHz i486SX processor is replaced by the SL Enhanced 25 MHz i486SX processor. - 10 uF - 16V capacitor C600 is installed between pin 13 of component U24 and ground. This corrects the problem of the SL Enhanced CPUs crashing when the clock is generated before the power supply voltage (+5 V) stabilizes.
BA2015	Nasc.	588086J		Motherboard used on the M6-520 Personal Computer. Soldered 25 MHz i486SX processor Overdrive II socket available This board experienced the same evolution as BASE ASSEMBLY BA2029.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2027	Nasc.	588088U		Motherboard used on the M6-540 Personal Computer. 33 MHz i486SX processor installed in the Overdrive II socket. This board experienced the same evolution as BASE ASSEMBLY BA2029.
BA2028	Lev. Nasc.	588089V		Motherboard used on the M6-560 Personal Computer. 33/66 MHz i486SX processor installed in the Overdrive II socket. This board experienced the same evolution as BASE ASSEMBLY BA2029.
BA2095	Nasc.		The ROM BIOS is a Flash EPROM. The following BIOS versions are used: - X0. 37. 30 - R1.47.32 - R1.47.36 See the specific table.	Base Assembly - Code BA2029 identifies the printed circuit board on which the different processors are installed. Depending on the processor installed, the printed circuit board will be identified with the BA name indicated further on. Replaces BA2029.
	Lev. 01			New printed circuit incorporating the updated wirings.
	Lev. 02			Component BT 481 KPJ-85 is no longer produced and is replaced by BT 481AKPJ-110.
	Lev. 03			- The 25 MHz i486SX processor is replaced by the SL Enhanced 25 MHz i486SX processor. - 10 uF - 16 V capacitor C600 is installed between pin 13 of component U24 and ground. This corrects the problem of the SL Enhanced CPUs crashing when the clock is generated before the power supply voltage (+5 V) stabilizes.
BA2096	Nasc.	589854Z		Motherboard used on the M6-520 Personal Computer. Replaces BA2015. This board has experienced the same evolution as BASE ASSEMBLY BA2095.
BA2097	Nasc.	589855S		Motherboard used on the M6-540 and M6-560 Personal Computers. Replaces BA2027 and BA2028. This board has experienced the same evolution as the BASE ASSEMBLY.

3

MOTHERBOARD INTEGRATED CONTROLLERS

MOTHER-BOARD	INTEGRATED CONTROLLERS

BA 2015
BA 2027
BA 2028
BA 2096
BA 2097
	CPU: M6-520 i486 SX @ 25 MHz soldered on the motherboard
	        M6-540 i486 DX @ 33 MHz installed in the Overdrive II
	                    Performance Upgrade Socket
	        M6-560 i486 DX2 @ 33/66 MHz installed in the Overdrive II
	                    Performance Upgrade Socket
	OverDrive II Performance Upgrade Socket: This socket can host the following processors: i487 SX - i486 DX2 - Overdrive Processor P24T
	Mad River Module This board is soldered on the motherboard and performs
	                    the following functions:
	          - Memory control
	          - CPU memory interfaceU
	          - DMA control
	          - MicroChannel control
	Galaxy I/O controller. This component integrates the following functions:
	     - Microchannel interface for internal peripherals
	     - Interrupt control
	     - Timer
	     - Keyboard and mouse control
	     - Real time clock and CMOS logic control
	     - Serial (COM1 and COM2) and parallel interface
	     - 82077 floppy disk controller support
	     - EPROM control
	Socket for the secondary level cache module
	NCR53C700-66 SCSI controller
	82077SL-1 Floppy disk controller
	ATI 68800 SuperVGA controller
	BT481 Video RAM DAC
	ATI-18811 Video programmable clock generator
	ICD2027 System programmable clock generator
	BIOS Flash EPROM
	EYE Allows tests to be run on the video subsystem
	RTC DS1387 CMOS Real Time Clock

BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
Motherboard	BA 2015	588086J	M6-520 motherboard
	BA 2027	588088U	M6-540 motherboard
	BA 2028	588089V	M6-560 motherboard
	BA 2096	589854Z	M6-520 motherboard
	BA 2097	589855S	M6-540 / 560 motherboard
PS11 A power supply			
PS11 A power supply			
PS11 AR power supply	220 V	588062 Z	
PS11 AR power supply	110 V	589579 D	
Bus expansion board	IN 2004	558049 M	

USER DISKETTE

LEVEL	NOTES
Lev. 1.02	
Lev. 1.03	New user diskette that solves configuration problems when memory address conflicts occur.
Lev. 1.04	New user diskette in which the bootstrap cycle is modified.

SYSTEM TEST

LEVEL	NOTES
1.0 upd 2	

ENHANCED VIDEO DRIVER

LEVEL	NOTES
ATI EVD Ver. 1.02	
ATI EVD Ver. 1.04	This version corrects the faults encountered during the test on the configurability of certain monitors.

POWER SUPPLY

POWER SUPPLY	LEVEL	DESCRIPTION
PS11 A - 220 V		
PS11 A - 115 V		
PS11 AR - 220 V		
PS11 AR - 115 V		

NOTES ON COMPATIBILITY

BOARD OR HW/SW DEVICE	DESCRIPTION

SOFTWARE DRIVERS

DRIVER	NOTES
NCR Driver Ver. 0.00	NCR drivers are supplied on two 1.44 MB floppy diskettes and include the drivers for the following magnetic peripherals: 1^{ST}floppy: DOS-Windows, NT-Windows, Novell, OS/2 2.1 2ND floppy: SCO_UNIX 3.2v4.0/42
NCR Driver Ver. 0.04	This version corrects some of the faults encountered during the test on the configurability of some of the drivers on SCSI channel.
NCR Driver Ver. 0.05	Some of the faults encountered during the test phase are corrected.

BIOS

| LEVEL	NOTES
X 0.36.27	
X 0. 37.30	Corrects some of the faults encountered during the testing phase in the different operating environments.
R1.47.32	Corrects some of the faults encountered during the testing phase in the different operating environments.
R1.47.36	This new BIOS version corrects the following faults: - Problems encountered in the MOREMEM.COM program code - Problems with OS/2 when a second floppy diskette drive is installed - Problems in managing more than three serial ports

SOFTWARE COMPATIBILITY

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, DOS 3.3X, 4.XX, 5.XX and later Olivetti OS/2, from version 1.3 upd 2, 20.0 IBM Operating System/2 standard edition, Ver. 1.1, 1.2, 1.3 and later IBM Operating System/2 Extended Edition, Ver. 1.1, 1.3 and later OS/2 Presentation Manager Standard and extended edition SCO OSF/Motif presentation manager IBM AIX 1.1 SCO UNIX System V/386 3.2 Ver. 2 for MCA IBM OS/2 LAN Server and Requestor Olinet LAN Manager 1.1, 2.0 Novell Netware 386, Novell advanced netware Windows 3.0 and later IBM PC LAN Program	Up to seven SCSI HDUs can only be managed from release 5.XX onwards.

3

HARDWARE COMPATIBILITY

MODEM	I/O INTERFACE PRODUCTS
Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349)	FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347)
EXPANSION MEMORIES	**MOUSE**
IBM PS/2 80386 2-6 MB Exp. Memory Option IBM PS/2 80386 2-8 MB Exp. Memory Option Olivetti Memory Expansion board MEM 26-503 Profit System Elite 16/2	IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
DISPLAYS	**NETWORKING AND LAN PRODUCTS**
IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514	IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Advanced netware Ver.2.12 3COM Network (Ethernet) 10NET Network
GRAPHICS PRODUCTS	**OTHER PRODUCTS**
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

MOTHERBOARD COMPONENTS AND JUMPERS
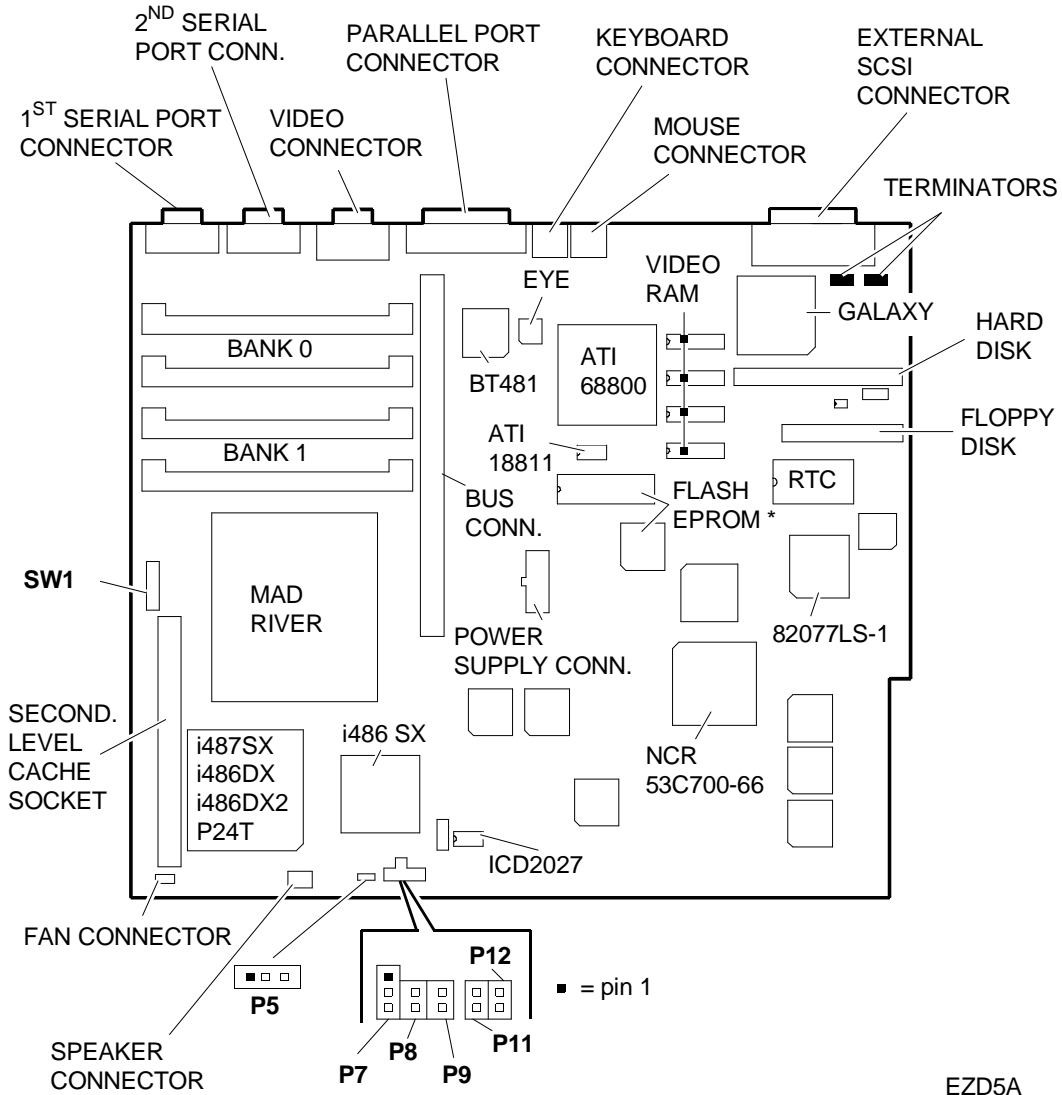
EZD5A

* BIOS Flash EPROM 28F010 on a 1 Mbit Dual In-Line chip
BIOS Flash EPROM 28F010 on a 1 Mbit PQFP chip (as an alternative to the previous chip)

Jumper P5 - SCSI terminator enable
IN on 1 - 2 *   Enables the SCSI terminators (internal SCSI peripherals only)
IN on 2 - 3   Disables the SCSI terminators (when external SCSI peripherals are present)

Jumper P7 - Power on password cancellation
To cancel the power on password and system configuration (excluding the video configuration),
invert the setting of this jumper. If this jumper was in its default 1-2 position, move it to position 2-3.
After the password is cancelled, restore the jumper to its default setting.

Jumper P8 - Floppy write enable - (Security feature)
Jumper installed   Disables write operations on drives with floppy disk interface .
Jumper not installed *   Enables write operations on drives with floppy disk interface .

Jumper P9 - Serial and parallel port enable - (Security feature)
Jumper installed   Disables serial ports COM 1, COM2 , and the parallel port.
Jumper not installed *   Enables serial ports COM 1, COM2 , and the parallel port.

Jumper P11 - Bootstrap enable from the serial ports - (Security feature)
Jumper installed   Disables bootstrap from the serial ports.
Jumper not installed *   Enables bootstrap from the serial ports.

Jumper P12 - Bootstrap enable from the floppy disk drive - (Security feature)
Jumper installed   Disables bootstrap from the floppy disk drive.
Jumper not installed *   Enables bootstrap from the floppy disk drive.

DIP-Switch SW1

DIP-SWITCH		FUNCTION	SETTING		DESCRIPTION
1	2	Selects the type of drive with floppy disk interface (Drive A)	ON	ON	3.5", 1.44 MB floppy disk drive Not available
			OFF	ON	3.5" 2.88 MB floppy disk *
			ON	OFF	5.25" 1.2 MB floppy disk drive Not available
			OFF	OFF	80/120 MB streamer Not available
3	4	Selects the type of drive with floppy disk interface (Drive B)	ON	ON	3.5", 1.44 MB floppy disk drive Not available
			OFF	ON	3.5" 2.88 MB floppy disk *
			ON	OFF	5.25" 1.2 MB floppy disk drive Not available
			OFF	OFF	80/120 MB streamer
5		-	OFF		Not used
6		-	OFF		Not used
7		System clock	ON		25 MHz (M6-520)
			OFF		33 MHz (M6-540 / M6-560)
8		EPROM write enable	ON		EPROM write is enabled. The BIOS can be updated using the appropriate USer Diskette utility.
			OFF		EPROM write disabled

* Default setting

SCSI CHANNEL CONFIGURATION

The rule to follow for configuring the SCSI channel is that all the devices connected (up to eight, controller included) must have a different identifier (SCSI ID) and that the bus is terminated at its ends only.

In all the configurations where peripherals are connected to the SCSI bus, the connection must not exceed the maximum length allowed for the SCSI channel, which is six meters.

Rules for Assigning the SCSI ID

Besides assigning a different address to the peripherals connected to the bus, the SCSI ID determines the priority for each one. On these systems, SCSI ID 0 is the highest priority while SCSI ID 7 is the lowest.

The absolute primary condition is that SCSI ID 0 be assigned to the system's first hard disk drive (the HDU in which the operating system is installed). This gives the first HDu highest priority.
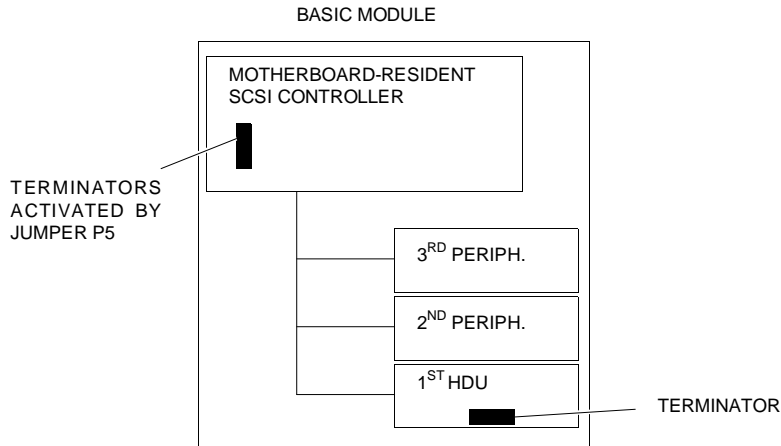
Through the BIOS, the SCSI controller resident on the motherboard is always assigned a SCSI ID of 7. An increasing SCSI ID (from 0 to 6) is assigned to the SCSI peripherals beyond the first HDU. For greater configurability, highest priority is assigned to the HDUs, followed by the STUs, DATs and CD-ROMs.

SCSI ID	0	1	2	3	4	5	6	7
Periph.	1ST HDU	2ND PER.	3RD PER.	4TH PER.	5TH PER.	6TH PER.	7TH PER.	SCSI Control.

The SCSI ID is assigned to each peripheral either via software, by means of the User Diskette, or by appropriately setting the jumpers or DIP-Switches on each peripheral. The SCSI ID of the SCSI controller is set at a fixed value of 7 and is assigned by the system BIOS.

Termination Rules

The SCSI channel must only be terminated at its ends (on the first and last device on the bus), therefore all terminators must be removed from the peripheral in-between. If there are no external SCSI drives, the primary HDU and the SCSI controller must always be terminated.

BASIC MODULE

MOTHERBOARD-RESIDENT SCSI CONTROLLER

TERMINATORS ACTIVATED BY JUMPER P5

3RD PERIPH.

2ND PERIPH.

1ST HDU

TERMINATOR

If external SCSI peripherals are connected to the basic module, remove the terminators from the motherboard and only terminate the last external peripheral connected.

BASIC MODULE

```
                    ┌──────────────────────────────┐
                    │  ┌────────────────────────┐   │        ┌─────────────────────┐
                    │  │ MOTHERBOARD-RESIDENT   │   │────────│ 6ᵀᴴ  PERIPH.        │
                    │  │ SCSI CONTROLLER        │   │        │ (EXTERNAL)          │
                    │  │                        │   │        ├─────────────────────┤
                    │  │ ┌──┐                   │   │────────│ 7ᵀᴴ    PERIPH.      │
                    │  │ └──┘                   │   │        │ (EXTERNAL)  ████    │
                    │  └────────────────────────┘   │        └─────────────────────┘
TERMINATORS         │                               │
DEACTIVATED         │       ┌────────────────────┐  │
BY JUMPER P5        │       │ 3ᴿᴰ PERIPH.        │  │
                    │       ├────────────────────┤  │
                    │       │ 2ᴺᴰ PERIPH.        │  │      TERMINATORS
                    │       ├────────────────────┤  │
                    │       │ 1ˢᵀ HDU            │  │
                    │       │         ████       │  │
                    │       └────────────────────┘  │
                    └──────────────────────────────┘
```
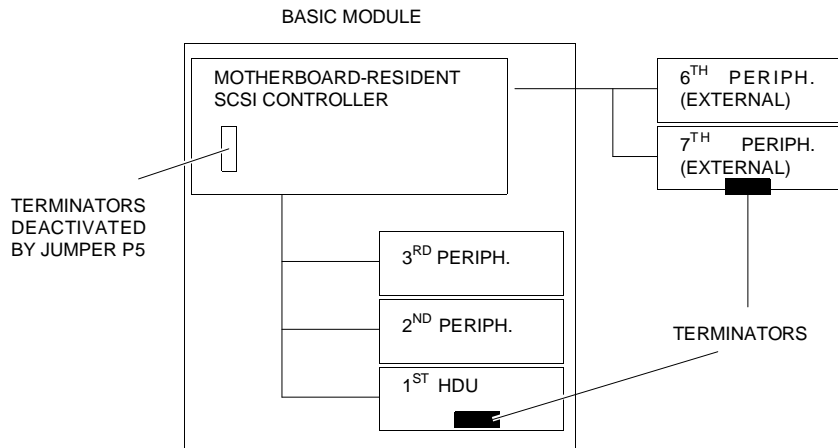
As seen previously, the SCSI controller is terminated by active terminators which can be either enabled or disabled by means of motherboard jumper P5. This operation must be performed manually during the installation phase.

The termination of peripherals connected inside the basic module must be made directly on the peripheral itself. Likewise, the termination of external SCSI peripherals connected to the basic module must be made directly on the peripheral itself.

INTERRUPT LEVELS

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 to 10 *	IRQ2	1	Interrupt issued from controller 2 to controller 1
3	IRQ8	2	Real time clock
4	IRQ9	2	Video Software redirected to IRQ2
5	IRQ10	2	Free
6	IRQ11	2	Free
7	IRQ12	2	Mouse
8	IRQ13	2	Coprocessor
9	IRQ14	2	Hard disk controller
10	IRQ15	2	Free
11	IRQ3	1	Serial port 2
12	IRQ4	1	Serial port 1
13	IRQ5	1	Parallel port 2
14	IRQ6	1	Floppy disk controller
15	IRQ7	1	Parallel port 1

* The priority level depends on the the interrupt selected. For example, if interrupt IRQ11 is selected the priority level is 6, or if interrupt IRQ15 is selected the priority level is 10.

DMA CHANNELS

CHANNEL	NUMBER OF BITS	FUNCTION
0	8	Reserved
1	8	Free
2	8	Floppy disk transfers
3	8	Video
4	16	Used for the cascade connection of DMA1
5	16	Free
6	16	Free
7	16	Free

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (0-3)	0E0-0E4 h	Reserved
020-02F h	Interrupt controller 1	0F0-0F1 h	Coprocessor reset
040-05F h	Timer	100-10F h	Reserved
060-06F h	Keyboard controller	201-208 h	Game port
070-071 h	Real time clock	278-27F h	Parallel port 2 (LPT2)
074-076 h	NVRAM	2F8-2FF h	Serial port 2 (COM2)
078-07C h	EEPROM	378 - 37F h	Parallel port 1 (LPT1)
081-08F h	DMA page registers	3BC - 3BF h	Reserved
090-096 h	Reserved	3C3 h	Video controller
0A0-0A1 h	Interrupt controller 2	3F0-3F7 h	Floppy disk controller
0C0-0DF h	DMA controller (4-7)	3F8-3FF h	Serial port 1 (COM1)

SYSTEM MEMORY MAP

000 KB	USER DATA AREA	00000 h
512 KB	BUS BOARD WITH ON-BOARD MEMORY	80000 h
640 KB	VIDEO RAM	A0000 h
768 KB	VIDEO BIOS SHADOW	C0000 h
896 KB	SYSTEM BIOS SHADOW	E0000 h
1024 KB	SYSTEM MEMORY	100000 h

■